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| APPLICATION NO | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO | CONFIRMATION NO |
|---|---|---|---|---|
| 09/749,865 | 12/27/2000 | Noriyuki Hirayanagi | 4641-56502 | 7443 |

7590 01/28/2004

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| EXAMINER | |
|---|---|
| KACKAR, RAM N | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 1763 | |

DATE MAILED: 01/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/749,865 | HIRAYANAGI ET AL. | |
| | Examiner | Art Unit | |
| | Ram N Kackar | 1763 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *15 December 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-6,15,16,38,39 and 42* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6,15,16,38,39 and 42* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
4) ☐ Interview Summary (PTO-413) Paper No(s) _____
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 38 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 38 recites the limitation "the exhaust valve " and "the exhaust pump" in line 13 and 14. There is insufficient antecedent basis for this limitation in the claim. Further, "HTG-inlet valve relative to the exhaust pump so as to supply heat transfer gas to the HTG channel, to operate the exhaust valve and exhaust pump relative to the HTG-inlet valve to remove heat transfer gas from the HTG channel," is not clear.

### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-6 and 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kakehi Yutaka et al (JP 07-273178) in view of Parkhe (US 6033482).

Kakehi Yutaka et al disclose a substrate holding device comprising an electrostatic chuck (Fig 1-60), longitudinal channels at the back-side of wafer (Fig 1-21 and Fig 2-21a), a helium gas supply conduit (23a) gas evacuation conduit (23b) and valves to control the flow of helium gas to

the channel (71,72). Kakehi Yutaka disclose the process sequence steps (Abstract and Paragraph 18 and 32) and discloses that the supply of HTG may be shut down almost before completion of etching process when RF power for plasma and DC power for chucking is turned off which causes evacuation of the HTG line (Abstract).

Kakehi Yutaka et al disclose process steps but do not explicitly disclose a controller to execute those steps.

Parkhe discloses microprocessor-based controller to control all aspects of fabrication including substrate back-side cooling (Fig 1-160).

Therefore it would have been obvious to use a controller like that of Parkhe to control the apparatus of Kakehi Yutaka so as to ensure accuracy, reliability and higher through put.

Regarding claims 2-5 as the controllers work through a preprogrammed recipe predetermined time would be obviously part of it.

Regarding claim 4 Yutaka et al disclose turning off heat transfer gas just before completion of fabrication process. Obviously turning off HTG too early could be harmful as the temperature of substrate could rise above acceptable level in the 20% of the time when cooling is not effective. Since 20% of process time could be quite long for some processes, it would make no sense to turn cooling off for such a long time at least for those processes. Therefore it would be obvious that HTG is not turned off before 80% completion of the fabrication process.

Claims 6 and 16 are not patentable as being directed to an intended use. The controller disclosed by Parkhe would be capable of controlling the sequence of a process typically encountered in an exposure process as above.

5. Claims 38-39 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shamouilian et al (US 6320736) in view of Onishi et al (JP62136570) and Parkhe (US 6033482).

Shamouilian et al disclose a substrate holding device comprising an electrostatic chuck (Fig 1), and a channel at the back-side of wafer (56a or 56b), a helium gas supply conduit (50) and a filter to remove impurities from heat transfer gas (Fig 5-60).

Shamouilian et al do not disclose the filter to be a cold trap.

Onishi et al discloses the use of cold trap to remove harmful gases from the exhaust gas to make it clean and recycle to the chamber and valve to isolate from chamber so as to remove the impurities by exhausting (abstract and Page 2 lines 9-22 translation in English).

Onishi et al disclose the steps of controlling the valves to recycle and remove impurities from trap but do not explicitly disclose a controller.

Parkhe discloses microprocessor-based controller to control all aspects of fabrication including substrate back- side cooling (Fig 1-160).

Therefore it would have been obvious for one of ordinary skill in the art at the time invention was made to use a cold trap of Onishi et al in place of ordinary filter so as to make sure that moisture and gaseous impurities are also removed from helium so as to have efficient heat transfer and keep the gas passages uncontaminated and to control the system using a controller as per the teaching of Parkhe

***Response to Amendment***

Applicant's arguments filed 12/15/2003 have been fully considered but they are not persuasive.

Applicant argues that in Yutaka there is no teaching of evacuation. Examiner disagrees.

In fact the evacuation results when the inlet is turned off, since the exhaust line is always connected to the pump (80) when the inlet is closed the line is quickly evacuated. This is also evident from the fact that Yutaka teaches against allowing gas to leak in to the chamber, which would be the case if there were no evacuation before substrate is removed.

Applicant's argument regarding the 80% limit has been answered above with respect to claim 4.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ram N Kackar whose telephone number is 571 272 1436. The examiner can normally be reached on M-F 8:00 A.M to 5:P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on 571 272 1439. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308 0661.

RK